THESIS

on

PLASTIC BRONCHITIS.

by

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P L A S T I C B R O N C H I T I S.

The disease of which I propose to treat is known by various names, to wit:--

(a) Pseudo membranous Bronchitis.

(b) Bronchial Polypi.

(c) Croupous Bronchitis.

(d) Fibrinous Bronchitis.

(e) Spastic Bronchitis.

(f) Plastic Bronchitis. (This one I shall adopt)

HISTORICAL.

All writers from an early date to the present time agree as to the rarity of Plastic Bronchitis. No-one individual has, in fact, had an opportunity of studying more than one or two cases, and it is probably for this reason that our knowledge of the disease is so incomplete.

The disease has been known from ancient times. Hippocrates (a) witnessed something very like it in Phericides/

(a) De morbis popular lib VII. SS-XLI.

Phericides, whom he describes as spitting up "white milky substances" which may well have been bronchial casts. Galen (a) once saw a "pulmonary vessel" expelled from the lungs. Samber (b) in 1728 records a case of severe haemoptysis, in which a "polypus" having many ramifications, was brought up. This polypus, like the "pulmonary vessel" of Galen, one can hardly doubt was simply a blood cast of the bronchial tube.

Plastic bronchitis was accurately studied, and described, by Clarke (c) and Lister in 1697.

DESCRIPTION of the various kinds of false membranes found in the air passages, other than those met with in plastic bronchitis. Ewart (d) classifies these membranes as follows:--

False membranes caused by the action of strong fumes or irritating fluids.

(a) Those produced by the inhalation of steam (Parker).

(b) Those produced by fumes of ammonia or alcohol in the form of eau de cologne.

(c) Those due to the introduction of strong solutions such as lactic acid (Hoffmann).

(a) De locis affectis lib 1 cap. 1.
(b) Phil Trans. Vol. XXXIV. p.262. Appendix Case No.6.
(c) Phil. Trans. Vol. XIX, 1697, p.779, Appendix Case No.6.
(d) Allbutts system of Medicine, Ewart Vol.V. p.27.

False membranes caused by the internal use of potassii iodidi (Fritzsche).

False membranes which must be distinguished from that of spastic bronchitis are also met with in Diphtheria, Phthisis, Erysipelas, Variola, Scarlet Fever, Measles, Typhoid, Bronchitis and Pneumonia; in various pulmonary and cardiac lesions, articular rheumatism (Degler) and in pemphigus (Mader).

According to F. de Havilland, Hall (a) a plastic exudation in the bronchial tubes may take place under three conditions.

1st As a primary and independent disease constituting what is known as plastic or croupous bronchitis.

2nd In association with croupous pneumonia, in which case it seems to be due to a continuance of the same process, as that on which the pneumonic consolidation depends.

3rd In association with true croup or diphtheria.

THE CASTS in Plastic Bronchitis have been described in the following terms:--

(1) Worm-like bodies.

(2) Vessels, or veins, of the lungs.

(3) Portions of the Arteria Aspera.

(a) St Bartholomews Hospital Reports XIII, p. 125.

(4) Polypi from the pulmonary vessels.

(5) Bronchial polypi.

(6) Plastic exudation from the bronchial mucous membrane.

(7) Fibrinous casts.

The casts vary in length, usually from two to three inches. Peacock (a) refers to one that extended from the trachea to the ultimate ramifications of the Bronchi. True bronchial casts are generally much firmer than the pseudo varieties, and can thus be expelled in absorescent masses; sometimes a complete bronchial tree is expelled. False membranes, on the other hand, usually come away in small pieces. Of the various kinds of pseudo casts those brought up in haemoptysis must closely resemble the true plastic cast.

Thus, while the casts in plastic bronchitis present affinities with the minute bronchiolar and sometimes the coarser bronchial plugs of pneumonia, with the tubular casts of diphtheria, and of membranous tracheitis, and occasionally with the plugs of inspissated mucus met with in acute bronchitis, especially of children, the formation of a aborescent mould of/

(a) Path. Trans. Vol. V. 1854. p.4.

of a large portion of the bronchial tree stands by itself, as a special and definite, although hitherto unexplained, pathological process.

Casts may be retained from one day to three weeks, but are generally expelled from five to ten days after their formation. The casts expectorated in Dr Hydes (a) case showed that the air tubes ramify after the style of the arteries, that the tubes go some distance without ramification, and then throw off a number of branches all springing from a common axis.

THE APPEARANCE OF BRONCHIAL CASTS.

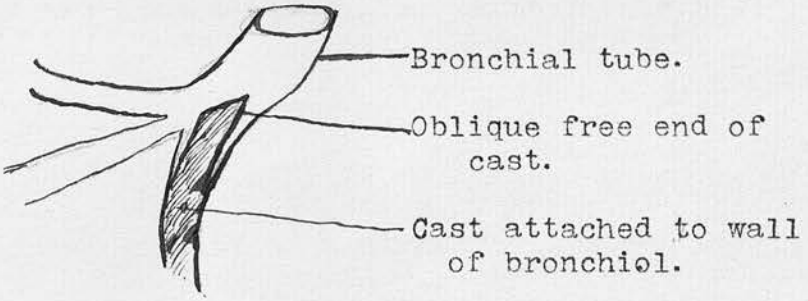
The casts are rarely thicker than a goose quill; they are of firm consistance, and often hollow, except those from the small bronchioles, in which case the bore is generally plugged with mucus. In colour they are white or pearly grey. Bulgings or knotty swellings are observed in places, and the stems are sometimes flattened.

Spaeth (b) states that the upper ends of all the casts are obliquely cut, and detached. He thinks this helps to explain the mechanism of expulsion, and suggests that the projecting ends of the casts are loosened by the respiratory current of air, and that by/

(a) Appendix. Case 42.
(b) Wurtumb Con Bl XXXVI. 8. 1866.

by this means and by the action of the bronchial muscle, the entire cast is detached.

Author's diagram explaining mechanism by which casts are detached according Spaeth.



Cheyne (a) following Michaelis, divides the bronchial casts into two groups.

The first variety occurs in connection with haemoptysis, and is simply a blood clot moulded into shape by the bronchial tree. This form is generally due to phthisis, and usually followed by further and probably fatal haemorrage.

In the second variety the casts are white, and more dense in consistency than the haemorrhagic form. Generally they are lamellated and solid but they are sometimes tubular.

Casts may be expectorated alone, or mixed with the ordinary bronchial secretion and rolled up in balls. Sometimes blood is present, and indeed in large/

(a) Path. Soc. Trans. Vol.V. 1854 p.41. Peacock.

large quantities. The amount of cast expectorated varies greatly. In one case, three to five spitoons-ful were brought up at a time, and the casts were 4½ to 6¼ inches long. The time of day or night at which they are expectorated also varies. In Sidlor's case it was always at night.

THE STRUCTURE OF BRONCHIAL CASTS.

The casts consist of a structureless or fibrillated matrix in which are embedded inflammatory cells, and altered gland cells; in the outer layers may be blood-and epithelial-cells. Some of the cells are pigmented. The casts swell up in acid solutions, but are soluble in alkalies, and in lime water (Wilson Fox). Rarely the casts consist simply of mucus. According to Championere and Waldenburg, they may contain fat. Bacteria, haematoidin crystals, Curschmann's spirals, Charcot-Leydens crystals and eosinophilic cells may also be present.

Griffon (a) in a communication to the French Anatomical Society showed the false membrane, with microscopical sections, from two cases of croupous bronchitis,/

(a) Gaz. Hebdom de Méd et der Chir. March 30th 1899 p.303.

bronchitis, and gave the details of their bacteriological examination. His examination suggests a different mode of formation for the two cases. In one, the disease was acute; streptococci were obtained from the culture, and were the only micro-organisms present in the exudate. The other was a slower case corresponding to the chronic type; the bronchial casts were highly developed, and exhibited numerous dendrites; cultures were found to be rich in pneumococci. It may be that the presence of these micro-organisms was simply accidental. Pneumococci are believed to live only a very short time in the lung; their presence, therefore, in the chronic case reported by Griffon, would show that they were capable of living a relatively long time on the bronchial mucous membrane.

According to Riegel (a) the cross section of a cast shows concentric layers, thus indicating that the deposits are laid down at intervals.

Waldenburg (b) reports a case in which the thickened stems exhibited numbers of fat globules, and very few mucus and pus corpuscles, in a slightly fibrillated, but otherwise hyaline ground substance. He states that sometimes a few cyclindrical epithelium cells/

(a) Ziemssens Cyclop Vol. IV. Riegel.
(b) Berlin Klin. Woch 1869, No.20.

cells are found. In this case P.M. examination showed that the casts had been produced in the middle and lower lobes of the right lung.

Sidney Roberts (a) describes the casts as consisting of a structureless hyaline, or faintly fibrillated material, containing large numbers of leucocytes, but no red corpuscles or epithelial cells.

Riegel (b) contends that the casts are not composed of fibrin, but of mucus, being thus analogous to those found in mucous collitis.

Peacock (c) alludes to the fact that the casts may contain particles of carbon, as happened in my own case, Microscopically he observed uniform parallel and straight fibres intermixed with numerous roundish bodies as large as blood corpuscles. He also found oil globules. He maintains that the casts consist of fibrinous exudation deposited in successive layers; any blood that is present may be readily washed off the cast, and is not intermixed, as is the case with the rusty sputum of pneumonia.

THE CAUSATION OF PLASTIC BRONCHITIS.

Age - The disease is most common between ten and thirty years of age. Peacock's statistics show the most frequent age to be between twenty and fifty years.

(a) Medical Press, Vol.2 p.496, 1890.
(b) Ziemmssens Cyclop Vol.IV. Riegel.
(c) Path. Soc. Trans. Vol.V. 1854, p.41.

Morrell (a) states that out of seventy-six cases only eleven occurred in children under twelve years of age.

Sex - Most writers are agreed that plastic bronchitis is much more frequent in males than in females. According to Peacock out of thirty-four cases, twenty-five occurred in males, nine in female. Biermer (b) states that it is twice as frequent in the former. In acute cases Lebert puts the proportion of men to women as 11.6, in chronic cases as 3.2.

Season - The disease is most frequent at those times of the year when pneumonia, and bronchitis, are most common. Spring is the time par excellens of its occurrence, probably as Riegel (c) remarks, because the daily variations of temperature are greater then.

Cold - As in the case of simple Bronchitis, often a history of exposure, or of having "caught a cold" in one way or another is obtained.

Dyscrasia according to Riegel, Madigan and Engelmann, an essential factor in causation is a certain dyscrasia, constitutional, or acquired; but this view does not help us much.

Menstruation - A case of Brik's (d) shows the association between the catamenia and the cast formation.

Oppolzer/

(a) Keatings Cyclop: of Diseases of children.
(b) Ziemssens Cyclop. Vol.IV, Riegel.
(c) Ziemssens Cyclop: Vol.IV. Riegel.
(d) Practitioner Vol. 43 1889. Dr West's paper.

Oppolzer records a similar case. First the attacks occurred for two years at every monthly period; pregnancy followed and the attacks ceased. There is seldom any regularity in the recurrence of attacks in ordinary cases.

Pregnancy - Beirmer quotes cases occurring during pregnancy (Wilson Fox).

CLINICAL DESCRIPTION.

I have tabulated and numbered all the cases of plastic bronchitis of which I have been able to find a record, and to some of these I shall refer in my description of the disease.

Plastic bronchitis is usually divided into the acute and chronic form, the latter being by far the more common; but the distinction bewteen acute, and chronic cases, is by no means easy, inasmuch as the symptoms in the chronic variety may be very severe. Biermer classifies all cases that last from one to four weeks as acute.

The chronic variety may continue for years with intermissions. In the acute form the disease may prove fatal before any casts have been expelled. Biermer refers to six such cases. Lebert was only able to collect records of seventeen acute cases.

In/

In cases that end fatally the duration is usually only a few days, the shortest was three days, the longest fourteen. The mortality (a) in acute cases is given at fifty per cent.

West (b) says that high temperature is usually found in acute cases, but in chronic cases the temperature generally ranges low. In Escherichs (c) case the temperature rose as the cast was forming, and fell at once when it was expectorated.

Cyanosis is occasionally observed in the acute variety as in Ogles (d) case, but is not the rule in the chronic form.

Pain is sometimes felt in the chest; it may be the result of violent coughing, and is sometimes referred to a limited area, determined probably by the situation of the cast, and disappearing with its expulsion.

The acute variety is much rarer than the chronic, it often begins with a rigor; the patient manifests the symptoms of acute catarrh; there is troublesome paroxysmal cough, a feeling of oppression at the chest, and all the manifestations of acute dyspnoea Sometimes/

(a) Ziemssens Cyclopoedia Vol. IV, Riegel.
(b) The Practitioner Vol. 43, 1889. Samuel West.
(c) Appendix Cases Nos. 55, 56, 57.
(d) Appendix Case No. 41.

Sometimes slight haemoptysis appears, but expectoration is conspicuous by its absence: after a few days, however, the patient may bring up the characteristic fibrinous cast, an event which is followed by great relief. When, however, the disease ends fatally, the casts may not be expectorated, dyspnoea increases, the face becomes cyanosed, and the patient lapses into a condition of stupification and somnolence. According to Biermer haemoptysis more often follows than precedes the expulsion of the cast. Sometimes the haemorrhage may be considerable, a circumstance that has given rise to the view that casts consist of coagulated blood. According to Cook[(a)], the expectoration of a single cast rarely brings an attack (acute or chronic) to an end. After some hours the cough and dyspnoea return, followed by the expulsion of another cast; a process usually repeated once in twenty-four or forty-eight hours for several days, small pieces being spat up at longer intervals. When the attack has passed off leaving the patient apparently well, it does not follow that the disease is at an end: it is liable to return again and again, sometimes for a long period of time.

The chronic variety: In this variety the symp-

(a) The Medical Press, 1893. p.603.

toms are generally preceded for weeks, months, or even years, by ordinary bronchitis, and then severe symptoms set in, in the shape of paroxysmal cough and dyspnoea, both of which disappear for a time with the expulsion of a cast: dyspnoea is seldom fatal in the chronic variety, owing doubtless to the disease being limited to a small number of the bronchioles. (West[a].)

Fagge[(b)] quotes a case in which death resulted from impaction of a cast in the trachea.

Pain is sometimes present; it may be due to violent coughing, occasionally it is localised to a small area, as in the acute variety. Haemoptysis is frequent. Profuse haemorrhage is recorded by West[(c)] in six cases out of fifty, one case only was fatal, but in it phthisis was found. In one epistaxis and haemoptysis both occurred. Haemoptysis when present is certainly not always due to phthisis: on the one hand when phthisis co-exists there may be no haemoptysis, and on the other haemoptysis may be profuse, and yet no phthisis exist.

West[(d)] refers to the haemorrhagic tendency of the blood/

(a) The Practitioner. Vol.43, 1889. West.
(b) Appendix, Case 46.
(c) The Practitioner. Vol.43, 1889. West.
(d) Appendix, Case No.62. West.

blood in the advanced stages of plastic bronchitis. This was a prominent feature in his own case and due, he suggests, to a defibrinated condition of the blood consequent on the abundant exudation of fibrinous material.

Albuminuria is noted by West, and referred by him to the dyspnoea. He does not agree with the late Sir John Rose Cormack in regarding this albuminuria as indicating a relationship between plastic bronchitis and diphtheria.

The onset of the disease is often sudden; fifteen out of fifty cases recorded by West[a] began suddenly. The duration may be considerable. Waldenburg's case continued for four years with intermissions. Kischl quotes a case in which the disease extended over a period of twenty-five years; in such protracted cases the intervals may be long.

PHYSICAL SIGNS.

Inasmuch as plastic bronchitis is often complicated by some other pulmonary trouble, the physical signs vary somewhat; they are not always well defined, and when the plugs are small and few, may be indeed entirely absent.[b] When the tubes are greatly obstructed,/

(a) The Practitioner. Vol.43, 1889. West.
(b) Appendix. Case 62. West.

obstructed, there may be retraction of the chest during inspiration. On palpation a tactile fremitus may be felt, due to movement of the bronchial cast. Pulmonary collapse may occur, causing dulness on percussion, absence or diminution of the respiratory murmur. Sibilant or moist râles of various sizes are not infrequent, or the coagula becoming loosened may cause a loud whistling (Corrigan) or a peculiar valve-like (Barth and Cazeause) or flapping sounds (Hoffmann). Riegel(a) affirms that in cases of firmly adherent casts, the inspiratory murmur is absent, the percussion note remaining unimpaired. In Ogle's (b) case the dulness extended over the greater part of the chest. In Hyde's(c) case, quoted by Salter, the physical signs were limited to a circumscribed area.

SEQUELAE.

Emphysema and chronic bronchial catarrh; Biermer also mentions the obliteration of bronchioles as an occasional sequela.

DIAGNOSIS.

This is only certain when the casts are expectorated. Peacock(d) quotes Valleix to the effect that/

(a) Ziemssen's Cyclop. Vol.IV. Riegel.
(b) Appendix. Case 41. Ogle.
(c) Appendiz. Case 42. Salter & Hyde.
(d) Path. Soc. Trans. Vol.V. p.41. Peacock.

that a probable diagnosis can be made when with the signs capillary bronchitis, the "petit bruit de soupape" is heard, together with sonorous rhonchi, and he refers in support of his opinion to cases observed by Caseaux and Barth. Cane[a] mentions a case in which he observed a similar sign, and Dr Gordon refers to peculiar flapping sound as heard in some of his cases. This sound cannot, however, be regarded as absolute; it can be produced by any viscid material partially obstructing a large bronchus.

DIFFERENTIAL DIAGNOSIS.

The disease may have to be diagnosed from:--

1. Diffuse Catarrhal Bronchitis.
2. Foreign Body in the Bronchus.
3. Pneumothorax (encysted).
4. Tracheal Croup.

PROGNOSIS.

This in the chronic variety with no complications is good. In the acute variety death is said to occur in half the cases.

THE RELATION TO OTHER DISEASES.

Plastic bronchitis may occur in people in good health. Some have sought to trace a connection with other/

(a) Appendix. Case 28.

other diseases, such as phthisis, syphilis. Ewart[a] says phthisis is present in a small number of cases; according to Model it occurred in ten out of twenty-one cases. Samuel West[b] observes that the connection between phthisis and plastic bronchitis must be very remote, seeing that the former is so common, and the latter so rare. The same authority remarks upon the frequency with which plastic bronchitis is observed after pneumonia; he quotes a case of Moller's in which pneumonia preceded the expectoration of casts by ten weeks, and another case of Adsersen's in which the interval was four months. When the interval between the two affections is short, it is possible that the casts are produced during the pneumonic process, but when it is long, as in the second case, this would seem to be improbable. West suggests that pneumonia may be the result of, as well as the cause of plastic bronchitis. It does not seem unlikely that plastic bronchitis may cause pneumonia; one can well believe that the plastic exudation may act as a foreign body, and also afford a nidus for the pneumococcus, especially in the debilitated.

Peacock/

(a) Allbutt's System of Medicine. Vol.V. Ewart.
(b) The Practitioner. Vol.43. 1889, West.

Peacock[a] maintains that plastic bronchitis occurs most frequently in those with weak lungs, though he acknowledges that it may affect people in perfect health. Of thirty-four cases collected by him, nine had symptoms of bronchitis or pneumonia; two occurred in the course of fever; two in advanced phthisis; seven commenced with haemoptysis. In this record nine of the cases showed sings of bronchitis or pneumonia, but as plastic bronchitis comes on with signs of bronchial catarrh, it is difficult to say how far the one is dependent on the other.

Sameul West[b] cites a case of Janeways in which was associated with acute destructive disease of the lungs, probably pyaemic in nature. In some of the cases quoted by this physician, there was a history of syphilis, in one a history of pleurisy; in five cases[c] mitral disease was present. In two of the cases the disease followed on acute disease - enteric fever and scarlet fever respectively.

Plastic bronchitis has been associated with pemphigus, two cases (Mader and Escherish) , Impetigo, (Waldenburg) and impetigo and herpes zoster (Streets).

(a) Path. Soc. Trans. Vol.V. p.41. Peacock.
(b) The Practitioner, Vol.43. 1889. West.
(c) Cases of Degan, Fraentyel, Starch, Bernowille, Escherich. Appendix, Case 59.

PATHOLOGY.

The fact that most false membranes have of late years been traced to a bacterial origin suggests that a similar causation may some day be established for plastic bronchitis. Mader [a] believed it to be a pemphigus of the bronchi, and has seen it associated with ordinary pemphigus of the mouth, nose and cheek. Salter holds that the expulsion of the solid casts is corroborative of the supposed deobstruent function of the smaller bronchial tubes. The bronchial membrane after death in cases of plastic bronchitis may be pale or injected, as in a case of Biermer's in which the epithelial lining outside the casts was present. The bronchi P.M. may contain casts or imperfectly solidified curdy collections; or they may be found empty, with a little mucus in them.

In Krètschy's case of exceedingly rapid casts formation the bronchi were deprived of their epithelium, and it was evident that the casts were not due to desquamation or transformation of cells, but to an outpouring from the blood vessels and lymphatics. He found the epithelium had disappeared without leaving any trace at the place occupied by the plug, having undergone metamorphosis or exfoliation. He holds/

(a) Wiener Med. Woch. 1882.

holds that the fibrin comes from the blood, and not from the epithelium, the escape of the cells also taking place from the blood vessels. He believes that the cast is formed from a transudation of an albuminous fluid (Fibrin) hardening rapidly after its secretion, and the exuded white blood corpuscles.

Rankin(a) quotes two opinions in reference to cast formation. The first attributes the formation of the membrane to excessive irritation; the second to excess of albuminous fluid in the blood.

Most writers favour the first view. Copland supports the second (Article on croup in Copland's dictionary.) In the one case as in haemorrhagic pleuritis or pericarditis the effusion may be the result of inflammation, so intense that the membrane formed may not only contain blood globules, but so closely adherent that its separation can only be effected with difficulty, and with the escape of more or less blood. In the other form, analagous to simple pleuritis, or pericarditis, the inflammation may be less severe, and consequently the membrane effused may be but little coloured and very loosely attached to the surface of the bronchi, and may be readily separated without producing haemorrhage.

That the membrane is not a mere coagulum is shown by the fact that though there may be attendant

(a) London Medical Gazette, Vol.XXVIII. p.832.

haemoptysis, the solid cast is white and not of the yellowish or red tint of decolorised blood-clot.

North[a] quotes two cases in which the casts looked like coagulated albumen rather than fibrin, several of the branches were hollow, and one part had the aspect of mucus. Bronchial inflammation was present, and a considerable time elapsed after subsidence of the bronchial affection before the polypi were expelled. From this it is clear that the polypi are not the result of the inflammation of the bronchial membrane, acute or chronic, for, were such the case, the polypi would be of much more frequent recurrence. North goes on to quote various opinions as to the nature of these concretions, and refers to Tulpius[b] who regarded the casts as pulmonary blood vessels, though he was at a loss to explain why the patient did not at once succumb after the separation of the blood vessels. He regards it along with his Professor Paaw of Amsterdam "Cen miraculum in auditum."

North[c] refers to the view that these concretions are due to an inspissation of the bronchial mucus, which adheres to the bronchial walls; the thinner part of the mucus being carried off by the constant/

(a) London Medical Gazette, Vol.XXII. 1838. p.330. Appendix. Cases 24 and 25.
(b) Observationes Medical. Lib.II. cap.3, Hist 98.
(c) London Medical Gazette, Vol.XXII. 1838, p.330. North.

constant current of air, a consistent and viscid mould of the bronchi is formed. Morgagni also holds this opinion. Drs Warren and Baillie, contend on the other hand, that the natural mucus of the bronchi would not, when dry, present the appearance of these concretions.

Some have supposed that the bronchial polypi are similar to the adventitious membrane found in croup. This appears improbable, for croup is almost always found in early childhood, while the polypi are practically confined to adults.

A German observer, Schmidt[(a)] made experiments to prove that artificial inflammation excited in the trachea of animals only produced the adventitious membrane in the very young; every attempt to produce it in the old proved abortive.

North summarises by saying that changes take place in the mucous membrane of the bronchi, whether from some peculiarity in the parts affected, or from constitutional dyscrasia, we do not know. The same remarks refer to membranous diarrhoea or membranous dysmenorrhoea. The mucous secretion gradually sets and forms a mould of the part in which it is contained.

The/

(a) Full account in Porter's Surgical Pathology of the Lungs.

The operation of epidemic influence in causing membranous effusions is shown in diphtheria, acute capillary bronchitis occurring as a complication of influenza and typhoid or eruptive fevers.

TREATMENT:

We must seek --

1st To remove the fibrinous mass in the bronchi.

2nd To prevent its re-formation.

The first of these objects may be achieved by the use of emetics; unfortunately, however, the casts are sometimes so firmly adherent to the bronchi, that it is impossible to dislodge them, and in these cases emetics, owing to their depressing effect, do more harm than good. Muriate of Apo-morphia subcutaneously injected in strongly recommended by Riegel, Bohm, Siebut, Quehl and Jurgeusen. A spray medicated with various drugs may be employed. Dixon has pointed out that casts are soluble in alkalies and lime water. Biermer used a lime spray with success. Tar inhalations (three drachms Pix Liquida to a pint of water) are recommended by Ogle(a). Internally, potassii iodidi was favourably spoken of by Thierfielder in 1854. Biermer recommends the free administration of Mercury. Inhalation of oxygen should be/

(a) Path. Soc. Trans. Vol.XI. p.23.

be employed in cases of sudden dyspnoea.

The method of intratracheal injection of oil or some mild solvent is still on its trial, but it has the objection that it may increase the obstruction to the air passages. Tracheotomy[(a)] and dropping creasoted oil 1 in 20 through the tube has dissolved a diphtheritic obstruction, and might be tried in an urgent case of plastic bronchitis.

Lactic acid and digestive ferments have been suggested by Rolleston. Trypsin has been used, but is liable to damage the mucous membrane. Bactericidal agents, and the hypodermic treatment by antitoxines are possibilities contingent upon the results of future pathological discovery.

CASE UNDER MY OWN CARE.

J.J. Age 50. Ironworker. Married.
Sent for me one evening, July 1896, as he was taken suddenly ill, with shortness of breath.

When I arrived at the house I found Mr J. walking up and down his room. He was a man of medium height, well built and strong-looking. I at once noticed that he had a distressed look. His face was somewhat flushed, and his breathing seemed rather shallow and short. I had never seen the patient before/

(a) Ewart & Hubert. B.M.J. Nov.27th, 1897.

before.

On enquiry found he had always enjoyed the best of health, had'never had a day's illness.' He had three children, all healthy and strong. His family history was good, father and mother both being alive and healthy. He had three brothers and one sister, all healthy. No trace of any pulmonary disease could be made out in any branch of the family.

He informed me that he was an iron-worker, and was exposed to great variations of temperature, as he worked with furnaces and in a very draughty place. He was a very temperate man and had all the comforts of a good home.

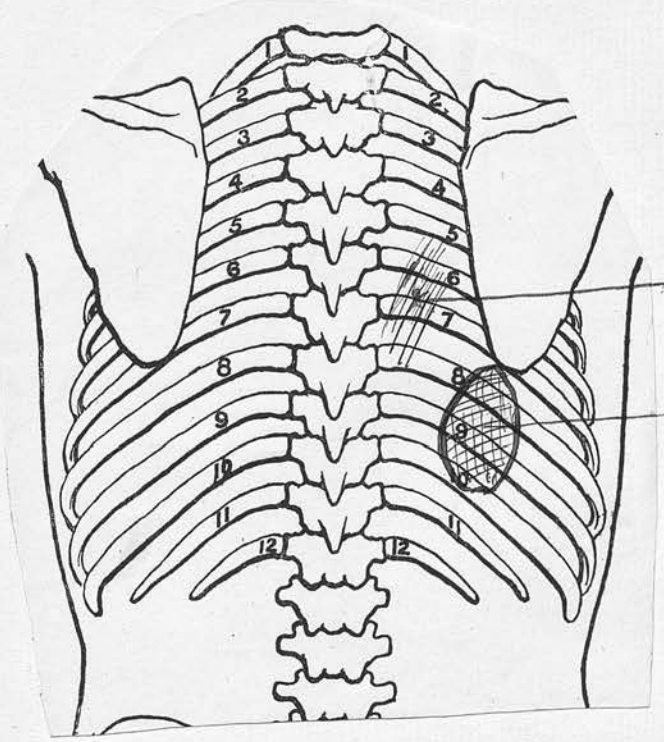
His present attack came on some six weeks before my visit, but he considered it only a slight cold, and thought he would soon be all right.

The patient complained of shortness of breath, which became much exaggerated when he lay down, paroxysmal cough, and a pain in the chest just below the right nipple, running through to the back. The cough was very dry in character, and the patient complained that he could not get up any phlegm, and felt sure he would be much better if he could do so. There was a distressing sense of suffocation.

Respiratory System:

Inspection: Respiration 20 per minute, rather shallow/

shallow and short, on deep inspiration the expansion of the chest was good; no retraction could be made out. Palpation over both lungs normal. Vocal resonance and fremitus normal. Percussion over both lungs normal, no dulness. Auscultation, left side was perfectly normal; right side in front normal; behind a few dry rhonchi could be detected



at the level of the sixth and seventh rib about one inch from the middle line, also a circumscribed area of fine crepitations just below the angle of the scapula; it was about the size of a five-shilling piece, situated under the eight, ninth and tenth ribs. These fine râles were most distinct during deep inspiration, and were constant. The rhonchi varied/

varied, and could not always be heard with the same distinctness. No dulness over this area could be made out.

Temperature was 98.4°.

Circulatory System: Normal, pulse 87 per minute.

Digestive System: Tongue slightly furred, bowels regular, quite normal.

Nervous System: Normal. The patient did not seem to be of a nervous temperament, but was naturally anxious about his condition.

Genito-urinary System: Normal. Urine Sp.Gr. 1020. slightly acid, no alb.,no sugar.

Diagnosis: From the following physical signs I was at a loss to account for the symptoms complained of. I thought of capillary bronchitis, also of a deep seated pneumonic patch, though the temperature did not support this view.

Treatment: I insisted on the patient going to bed, and he was supported by a bed rest. I ordered an expectorant mixture, and also the bronchitis kettle with tincture benzoin co. added.

Second day: Patient's condition was much the same as on previous night; he had passed a very restless night, and the dyspnoea had increased at intervals, any extra movement aggravating it. He had a slight frothy expectoration. Cough paroxysmal, but not very/

very troublesome. Temperature normal. Respiration 20 per minute. The same physical signs were present as on previous night. Patient took light diet fairly well. I ordered him sulphonal, grains 30, to be taken at night time.

Third day: If anything a little worse, the pain in chest was very annoying, and dyspnoea was decidedly worse: had slept better, but looked worn out. Temperature and respiration exactly the same. The physical signs in the chest were much more distinct, and the area of crepitation had increased quite half an inch all round. The rhonchi were louder and more general, though still confined to the right side. I now became suspicious of a foreign body having lodged in one of the tubes, but the patient assured me that this was quite impossible. Cough was now troublesome, the expectoration being frothy, and distinctly bronchitic in character; small particles of carbon were mixed with the expectoration which, in view of the patient's occupation, was not surprising. I increased the strength of his expectorant mixture and again ordered thirty grains of sulphonal each night, and the constant use of the bronchitis kettle. I applied a blister over the circumscribed area.

Fourth day: Was much surprised on paying my morning visit/

visit to see my patient sitting up in bed with a smiling countenance, having his breakfast. He informed me that about 6 a.m. the dyspnoea had been very severe, and that after a paroxysm of coughing lasting for about ten minutes, he had expectorated a quantity of frothy material with something hard in it, after which he experienced great relief. On examining the sputum I observes a rounded substance in a quantity of frothy mucus. I placed it in water and to my surprise found a plastic cast, well formed, and rolled up into a ball: the ramifications were distinct; it was pearly white, and about two and a half inches long. This was the only one he had brought up. The cough was still paroxysmal, but not so distressing; the dyspnoea was almost gone, and the pain in chest had quite ceased; expectoration was fairly free, no blood was seen. The physical signs in the chest were much the same as before, but the râles were coarser and louder. The treatment was as follows:-- to continue the mixture; the employment of a spray of lime-water; the sulphonal to be discontinued.

Fifth day: The patient brought up another case, slightly smaller than the first, and rolled up into the same spherical shape; there were still paroxysms of dyspnoea and cough, but neither were so/

distressing as at first; the temperature still continued normal.

The disease lasted another seven days, and the patient brought up a cast regularly every twenty-four hours, some slightly smaller. They were not always expectorated at the same time of day. They always came up after a paroxysm of coughing. The physical signs in the chest began to clear up, and at the end of the twelfth day none could be detected. The patient rapidly improved, and in fourteen days appeared quite well. He went out, and I saw him from time to time during the next four weeks, and there was no return of the trouble. After two months, however, he had another attack exactly similar to the first, though milder in type. This time he only brought up five or six casts, after which recovery was rapid. Since this attack there has been no recurrence.

Description of Casts.

The casts all ranged from one and a half inches to two and a half inches in length; some were solid, but a few of the larger ones were found to be hollow, they showed beautiful arborescent endings, and the thick/

thick ends were distinctly oblique. Most of them were somewhat broken - the accompanying diagram (a) shows the best specimen. There was no appearance of blood, and a few epithelium cells were found on the surface of the casts, also minute black particles of carbon. The casts were pearly white in colour, and were found to be composed of layers of fibrin, in the meshes of which were corpuscular bodies; occasionally the lamellar layers were separated by spaces containing air and mucus. No fat was present.

(a) Diagram on page 34.

REMARKS.

The noteworthy points in this case are:--

1. The absence of a history of any previous illness that could give rise to the formation of plastic casts in the bronchi.

2. The recurrence of the second attack without any definite cause.

3. The paroxysmal cough.

4. The limited physical signs.

5. The absence of high temperature.

The casts were evidently not large enough to entirely prevent the ingress of air, as I could never detect any part of the lung in which air was not entering.

THE APPENDIX.

Of sixty-eight published cases, forty-four occurred in males, twenty-one in females. In three cases the sex was not noted. Of the sixty-eight cases recovery took place in forty-nine; death in sixteen; in three cases the ultimate result is not recorded. Pain in the chest is specially noted in eleven cases out of sixty-eight.

Phthisis: A history of this disease was obtained in three cases, a fact which goes to disprove that the two diseases have anything in common.

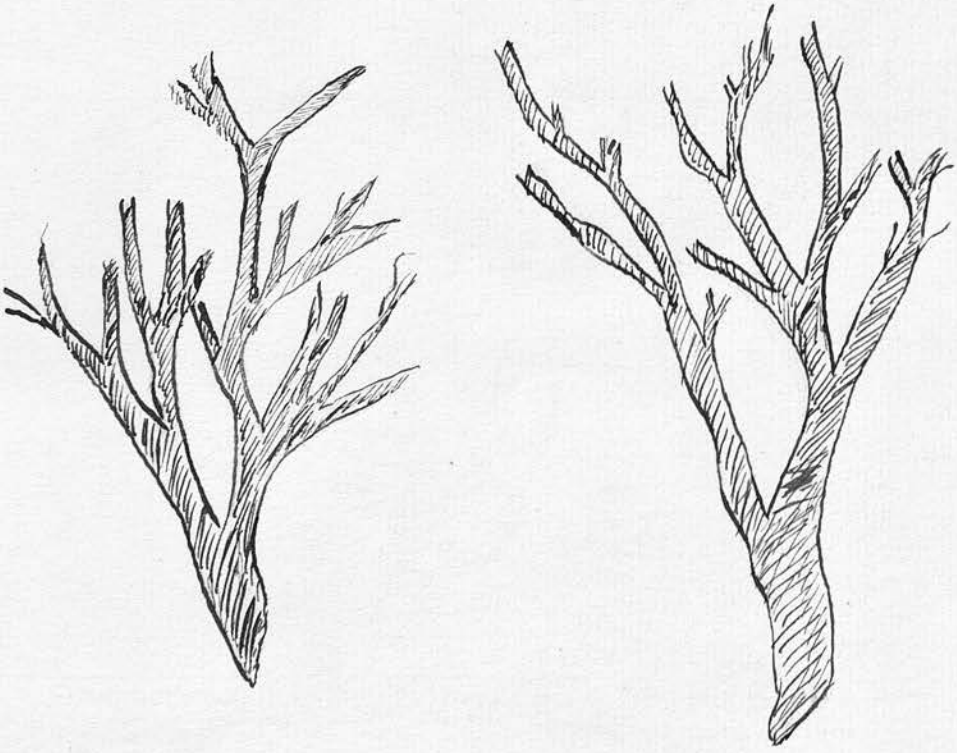
Haemorrhage: Severe haemorrhage was noted in seven cases/

cases: slight haemorrhage in nineteen, so that in thirty-eight cases it either did not occur, or was not noted.

Pneumonia: This was noted in nine cases out of the sixty-eight. This is a small proportion, and goes to prove that pneumonia can hardly be the cause of plastic bronchitis.

Bronchitis: This was noted in ten cases only.

Physical Signs: Out of sixty-eight cases the signs were well marked in twenty-six cases; slightly marked in fourteen cases; they were said to be absent in six cases; in twenty-two cases no mention is made of physical signs.



A P P E N D I X.

Sixty-eight cases.

Sixty-eight published cases are tabulated and numbered. The exact reference in each case is given. I have included thirty-four cases collected by Peacock, and published by him in the Pathological Society's Transactions of London, Vol.V. The remaining thirty-four cases I have myself collected and tabulated, and have thus brought the complete list up to date. I have only given the chief features of each case, with the results.

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APPENDIX.

Published Cases of the so-called Bronchial Polypus, or Plastic Exudation from the Bronchial Mucous Membrane.

	Name of Author, Date and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
1682.	1. "ACTA ERUDITORUM Anno 1682, Lipsaie, 1682 p.218; and JOURNAL DES SAVANS", 12mo. tome pour l'année 1684, p.60		F.	Had suffered for several weeks from heat in the chest.	Brought up suddenly a large quantity of blood which was checked for three days and she suffered only from some difficulty of breathing. On the fifth day the haemoptysis recurred, and she expectorated a branched membranous body.	Continued to spit blood and pieces of membrane and died, with symptoms of pulmonary inflammation on the twentieth day.
1697.	2. CLARKE. "PHIL. TRANS." Vol. XIX. 1697, p.779.		M.	Had been ill, at intervals, for four years.	For three years had coughed up polypi, preceded by severe cough and pain in the chest, which was regarded by the relatives as worms; but Dr Lister, to whom the report was sent, stated that they were "a viscous secretion" from the bronchial membrane.	Not stated.
1700-1.	3. BUSSIERE, "PHIL. TRANS." Vol. XXII.	5	M.	Consumptive, and had a dry cough for a year, and occasionally spat blood.	Shortly before death expectorated what appeared to be "vessels of the lungs"; and on examination afterwards, a thin film was found extending from the larynx to the extremities of the bronchi.	Died.

	Name of Author, Date and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
1704.	4. MORGAGNI "ON THE SEATS AND CAUSES OF DISEASE," Alexander's translation, Vol.I., p.597; letter 21, sects 19 and 20. Morgagni also mentions a man, 78 years of age, expectorated polypus concretions mixed with blood, on the fourth day of a peri-pneumony, of which he died four days after.	Young	M.		In the case of a young man who died of peri-pneumony in 1704, shreds of membrane were expectorated, mixed with blood and mucus; they resembled the bronchial ramifications. The patient died in a few days.	Died.
1727.	5. STRUVE. In "ACTA MED.PHYS.NAT. CUR." Vol.I., Norimb. 1727, obs.96; quoted in Michaelis "DE ANGINA POLYPOSA." Gottingae, 1778, p.294, c.13.	12.	M.	Previously healthy.	Suffered during four successive winters from violent bronchitic attacks, which were only partially relieved after five weeks, when he obtained entire relief, on expectorating portions of membrane, hollow and resembling a vein. In the intervals he was quite well.	Recovered.
1728.	6. SAMBER. "PHIL.TRANS." Vol.XXXIV. 1728. p.262.	50.	M.	Gouty and had had a cough for six months.	Vomited a large quantity of blood, and soon expectorated a polypus, and died of consumption a month after.	Died.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
1731.	7. NICHOLLS. "PHIL. TRANS. Vol. XXXVII. 1731-2. p.123.			Asthmatic, but otherwise well.	After an attack of inflammation of chest with pleuritic pains, he coughed up phlegm, resembling worms tinged with blood, and expectorated similar matters, either pale or tinged with blood, for seven years.	Not stated.
1740.	8. KELLNER. "ACTS. NAT. CUR." Vol. V. 1740, p.283: obs.74.	27	M.	Father had died of consumption; and he had been, previous to his marriage, subject to bleeding at the nose.	Seized, in 1734, with violent haemoptysis, and on the sixth day brought up pieces of membrane, and died on the seventeenth day.	Died.
1744.	9. SCHUSTER. "ACT. NAT. CUR." Vol. VII. 1744. Obs.44, p.126.	19	M.	For some time previously out of health.	Expectorated after a severe cough, a membranous substance which resembled a vessel about three inches long, and of the size of a quill and branched. The expectoration does not appear to have been attended with any escape of blood or other serious symptom.	Recovered.
1759.	10. DALBY or DALBAIS. "JOURNAL DE MEDICINE, CHIRURGERIE, PHARMACIE, etc."; par M. Vandermonde. Paris, 1759, tome XI., p.42.	22	F.	Delicate and liable to palpitation.	Was confined, and some months after was taken with fever, pain in the side, rapid respiration and violent cough, and expectorated, on the fourth day, a piece of membrane, white, solid and branched, and of the thickness of a writing quill, without apparently any blood. Died on the sixth day.	Died.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of case.	Result.
	11. IBID. Op.cit. p.370.	40.	M.	Full habit, and fond of drinking and singing.	Suddenly attacked with haemoptysis, which was relieved by bleeding. After a violent fit of coughing. he expectorated a piece of flesh, and the cough and spitting of blood ceased. Enjoyed good health for a year, and then became phthisical and died in eighteen months.	Died.
1764.	12. MARCORELLE. "HIST. DE L'ACADEMIE DES SCIENCES." An.1762. Paris, 1764. p.53. M.Marcorelle mentions having seen similar matters expectorated by a woman during inflammation of the chest.		M.	Long subject to to difficulty of breathing,cough, and expectoration.	In 1751, was taken with great difficulty in breathing, pain of chest and cough, and, after a severe paroxysm, expectorated a hollow ramified body, about three inches long, and soon after entirely recovered. There was no bleeding at the time; but the matters expectorated were, for a few days, mixed with pus.	Recovered.
1767.	13. WARREN. "MED. TRANS." Vol.I. p.407. 1767.	8.	F.	Of strumous habit.	Taken with symptoms of subacute inflammation of chest, and, on awaking in the night of the twelfth day, coughed up a solid membrane, and continued to expectorate similar material every few days, for a year, when scrofulous disease occurred in the heel, and the pulmonary symptoms disappeared. The membranes were solid or tubular, sometimes very frail, sometimes resistant - generally of a white colour but, once or twice, tinged with blood.	Recovered.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
1774.	14. MURRAY. "NOVI COMMENTARII GOTTINGAE," T. IV. 1774. "COMMENT. PHYS. ET MATH." p. 44.	21	M.	Of Phthisical tendency and had suffered from cough for some months.	Suddenly seized in 1770 with spitting of blood, and in a few days expectorated masses of membrane mixed with blood and mucus. These continued to recur with attacks of haemoptysis, for some months, and then ceased. He recovered entirely, and continued well, after an interval of two years.	Recovered.
1783.	15. DIXON. Duncan's "MEDICAL COMMENTARIES," Vol. IX. 1783-4. p. 254. This case was seen by Drs. Cullen and Warren. The writer mentions that the celebrated Professor M'Laurin occasionally expectorated similar matters.	48	M.	Gouty, but otherwise healthy.	Was seized with catarrhal symptoms and hoarseness, and soon after began to spit up solid material of a white colour, which was expectorated with a severe cough, and was preceded by constriction of the chest; both symptoms were relieved after the expectoration. The attacks ceased at intervals, and were aggravated during cold weather and by exposure.	The concretions still continued to be expectorated at intervals nearly two years after the first appearance of the symptoms.
1785.	16. MOYLE. "LONDON MEDICAL JOURNAL. Vol. VI. 1785., p. 252.	Surgeon.	M.	Originally of delicate constitution.	Was seized in 1772 with slight haemoptysis, cough, and hectic symptoms. In 1776 had a severe cough and expectorated a large quantity of blood, and, two days after, brought up a polypus concretion, with some coagulated blood on the surface. The difficulty of breathing was at first much relieved, but the day after the haemoptysis returned and he died almost immediately.	Died.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
1837.	17. JOHN HUNTER. Works by Palmer, Plate 22 and p.13. 1837. Case occurred about 1875.	22.	M.	Weakened by having taken mercury.	Suffered from violent cough and pain in the chest, and expectorated mucus mixed with blood and after a fortnight, portions of membrane; these became very numerous and larger; and the cough declined, and then ceased entirely.	Recovered
1802.	18. ACHERIUS. "LONDON MEDICAL AND PHYSICAL JOURNAL," Vol.VIII. 1802-3. p.102.	15.	F.	Attacked, six weeks before with vomiting and gastric symptoms and recovered at the end of eleven months and continued well a year and a half.	Suffered from aguish symptoms and wasting, with severe cough and dyspnoea, and soon after began to spit up pieces of membrane, either with or without blood and mucous, and then experienced relief; but six months after the symptoms returned, and the membranes were brought up with a dry cough, and tickling in the throat. This soon entirely ceased.	Recovered
1802.	19. MR BRENNAN. "LONDON MEDICAL AND PHYSICAL JOURNAL," Vol.VIII. 1802-3. p.360.	40.	M.	Addicted to spirit drinking and had suffered from sea-scurvy.	Admitted into Hospital, from ship at Chatham, with symptoms of low fever, and treated by stimulants, and soon after expectorated pieces of membrane, and died the following day. Had bled at the nose but had not spat blood.	Died.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
1809.	20. CHEYNE. "PATHOLOGY OF THE LARYNX" &c. 1809. See also the paper on Bronchial Polypus" as originally published. "ED. MED. AND SURG. JOURN." Vol. IV. 1808. p.441. Dr. Cheyne refers to a specimen in Dr Munro's Museum, which has been expectorated by a patient during a peripneumonic attack.	50 to 60.	M.	Declining in health for some months.	Early in May was seized with symptoms of acute bronchitis, and after a few days, expectorated at intervals, membranous masses, which appear to have been formed on the mucous membrane of the lower part of the trachea and bronchi. He was repeatedly bled and the blood drawn was cupped and buffed. Only two small pieces were expectorated after the 15th of May, and he was entirely convalescent on the 20th, when the last report is given.	Recovered
1814.	21. RAICKEM. "BULLET. DE LA FACULTE DE MEDICINE." T. IV. 1814-15. p.38. With report by MM. Chaussier and Louyer-Villermay.	12½	F.	Lymphatic temperament and subject to catarrhal affections.	At the age of 12, having suddenly suppressed an old issue, six months after she was seized with symptoms of subacute bronchitis, and after having first expectorated a viscous substance, began to cough up casts of the bronchi and their ramifications. These peculiar sputa ceased in a few days, but again appeared at intervals, after the lapse of a year, and when she was otherwise in good health.	Recovered
1820.	22. ILIFF. "LONDON MEDICAL REPORT" Vol. LVIII. 1820. p.207.	56.	M.	Enjoyed generally good health.	Taken with inflammation from cold, and began to expectorate a jelly-like substance, resembling the bronchial ramifications; he had s severe cough and dyspnoea, which was relieved by the expectoration.	Recovered in three months.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
1836.	23. CASPER. "BRIT. AND FOREIGN REV. Vol.II. 1836. p.554. Quoted from WOCHENSCHRIFT KEILKUNDE," No.1. 1836.	12.	F.	Lymphatic Scrofulous habit; had had slight hoarseness for many years, which continued after the attack.	Taken with inflammatory symptoms; relieved in four days, and three days after began to expectorate with severe cough, yellow ramified bodies, and in following twelve days expectorated twenty-two pieces; generally bringing up one every morning and evening. She was then otherwise quite well.	Recovered.
1838.	24. NORTH. "LOND.MED.GAZ." Vol.XXII. 1838. p.330.	21.	M.	Attacked, at age of four years with inflammation of lungs, from which he recovered entirely, and was well and strong afterwards, excepting a slight cough.	At 17 years of age cough became more severe, and he began to expectorate curdy matter, and after a time had a very severe cough, and expectorated large quantities of casts of bronchial tubes for several days, without febrile symptoms. He recovered in a few days and remained well for two years, when he was again attacked with cough and dyspnoea, followed by return of membranous expectoration, slightly tinged with blood, but these symptoms again soon subsided.	Recovered and had remained perfectly well for two years.
1838.	25, NORTH. "LOND.MED.GAZ." Vol.XXII. 1838. p.330.	17.	M.	Always delicate and liable to cold, and had slight cough.	Sudden attack of cough and dyspnoea, and then began to expectorate concretions; dulness on percussion above the clavicle, but no fever or pain of chest. After several weeks had recovered entirely, when the symptoms returned, and on third day the expectoration recurred, and continued very frequent for many days. He again	Well a year and a half after last attack.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health	Mode of Attack and History of case.	Result.
					recovered, and relapsed after a period of several weeks, and expectorated a few polypi, but finally recovered entirely.	
	26. WATSON. Lectures "LOND. MED. GAZ." Dr Watson also mentions Dr. Paris having had a patient who coughed up considerable quantities of membranous casts for a long period.	Professor Middle aged.	M.	Previously remarkably stout and healthy.	Sudden attacks of haemoptysis, every few days, without cough, followed, after a period of three weeks, by the expectoration of membranes in a branching form. These casts were of two kinds, one solid and somewhat coloured, the other tubular, white and membranous.	Recovered
	27. WATSON. Lectures "LOND. MED. GAZ."	Barrister Middle Aged.	M.	Had suffered for nearly a year from huskiness of voice.	Sudden expectoration of small quantities of fluid blood, followed by expulsion of masses resembling fibrinous coagula, and branched.	Recovered
1840.	28. CANE. "DUB. JOURN. Vol. XVII. 1840, p. 116.		M.	Lymphatic temperament, but enjoying good health, and inclined to obesity.	Taken with symptoms of pneumonia, and after six days when he was recovering, the usual russet sputa were replaced by membranous casts from the bronchial tubes, the expectoration of the casts being preceded by suffocative cough: relieved by the expectoration. The membranous expectoration ceased in a few days.	Recovered

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
	29. DR CORRIGAN. Ibid. Op.cit.	40.	M.	Seems to have been long out of health and described as resembling a person in the last stage of cardiac disease.	Had peculiarly hard cough and difficulty of breathing, and expectorated casts from mucous membrane of bronchial tubes, which ceased in a few days.	Recovered.
1840.	30. STARR. "LOND.MED.GAZ." Vol.XXV. 1840. p.736.	22.	F.	Took cold when two years of age, and had almost entire loss of voice ever after.	Seized with symptoms of sub-acute bronchitis, and in about ten days began to expectorate masses of membrane, resembling ramifications of bronchial tubes, tinged with blood; catamenia irregular, but she was not materially indisposed. Recovered in a short period.	
1841.	31. RANKING. "LOND.MED. GAZ." Vol.XXVIII. 1841.	20.	M.	Had suffered from three previous attacks of haemoptysis within a few months with palpitation and catarrhal symptoms, giving rise to suspicion of phthisis.	Seized one morning on awaking with expectoration of mucus mixed with blood, together with membranous masses, expelled by hawking. Little the matter with him except slight bronchitic symptoms, and improved in three or four days, and soon entirely recovered.	Recovered.
1848.	22. BARKER. "MED-CHIR. TRANS." Vol.XXXI. 1848. p.51.	22.	F.	Of irregular habits.	Was attacked nine months before after three months of delicate health, with cough, aphonia, and dyspnoea, and these symptoms suddenly became very urgent, and thracotomy was performed nine days after her admission into St. Thomas's Hospital. She was nearly suffocated at the time when a clot of blood was removed, and with it portions of membrane, and she rallied. Five days	Died exhausted of laryngeal ulceration, haemorrhage, and phthisis.

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
					after the symptoms again became urgent, the bleeding recurred, and similar matters were removed, and she then improved, so that the wound healed and she breathed freely, in about a month. But she died exhausted six weeks after the operation. After death the laryngeal mucous membrane was found extensively ulcerated, and the lungs contained much tubercle.	
1849.	33. THORE, fils. "ARCH. GEN. DE MED." 4me serie. T. 20. 1849. p. 295.	14.	M.	Healthy constitution, but had had similar though much more severe attack when 9 or 10 years of age, and was then not expected to recover.	Was suddenly seized with symptoms of violent pulmonic inflammation; two days after, with a severe fit of coughing, he expectorated pieces of membrane of a tubular form, and pale rose colour and branched. He continued to have severe fits of coughing, and to expel similar membranes every day or two, for ten days but he was otherwise much relieves after the second day. He has been entirely well for four days, when the report ceases on the fourteenth day.	Recovered.
	34. IBID. A patient of M. Lessere, of Montauban.	9.	F.	Of very delicate constitution - rachitic, and whose mother died of phthisis. soon after her birth.	After having presented symptoms of hectic for three months and a half, she suddenly expectorated, with a severe cough, pieces of membrane, mixed with mucus and streaks of blood. For the next fifteen days she continued to expectorate similar matters, every second or third day,	Recovered. The report terminates on the eighteenth day and the serious symptoms had subsided a few days af-

	Name of Author, Date, and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
					being much easier in the intervals.	ter the first appearance of the membranous sputa.
1844.	35. REID. "LOND. MED. GAZ." June. p.411.	28.	F.	Attack of Bronchitis, left behind cough.	Cough paroxysmal, with sense of suffocation. Expectorated frothy mucus tinged with blood and several aborescent membranes resembling minute casts of the bronchial tubes. Recurred five or six times at intervals of from one to six weeks. Left for the country, which did good, but on returning the attacks came on again. The dyspnoea was more severe than before, and casts expectorated in larger quantities, and firmer in character. Also a slight amount of blood accompanied the expectoration of casts.	Recovered attack, but died soon after of a different cause.
	36. Do.	Middle	M.	Always healthy.	Complained for two years of uneasiness about the throat and fauces, and of there being something he wanted to cough up. He then had very violent paroxysms of coughing lasting for half an hour: after which the voice remained husky and there was a ringing cough and sense of uneasiness at the upper part of the sternum. He recovered from symptoms, but had had occasionally cough and expectoration of mucus, later a	Recovered.

	Name of Author, Date. and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case	Result.
					sudden and profuse attack of haemoptysis came on without effort, it was followed by a convulsive cough, arborescent felsh-like substances were brought up with great relief. The symptoms subsided for a time, but came on again with haemoptysis, patient expectorated several tubular substances resembling plastic casts of the smaller bronchial tubes. He had four or five attacks during the subsequent ten days, each time haemorrhage occurred, and tubular casts were brought up. Two years after had another attack.	
1850.	37. CASPER. "BRITISH AND FOREIGN REVIEW." II.	12	F.	Strumous girl.	Signs of inflammatory catarrh with dyspnoea and paroxysmal cough. Expectorated whitish-yellow polypoid body of a tenacious character and corresponding to the bronchial ramifications.	Not stated, probably recovered.
1853.	38. PEACOCK. "PATH. SOC. TRANS." Vol. IX. p. 53.	27	M.	Been ill two years. His illness began with repeated attacks of epistaxis which continued to recur at intervals.	Caught cold with cough, expectorated mucus. Three months after brought up casts. He stated that he felt them in his throat. When expectorated they were rolled up in small balls about the size of a pea or bean, but when opened they were found to be branched. Sometimes expelled free from any mucus, at other times with mucus. No spitting of blood, casts white. They were brought up at uncertain times, sometimes two or three pieces every few days, or might be a week. No albumen, Consolidation of apex of one lung. Microscopically delicate, newly-formed fibrillated	Recovered.

	Name of Author, Date, and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	
					tissue with blood corpuscles more or less attached, but without true cells or nuclei.	
1854.	39. PEACOCK. "MEDICAL TIMES AND GAZETTE. 2/54. p.658.	11	M.	Boy always been delicate, when six had Influenza, and since then had cough and expectoration. Father has phthisis.	After Influenza, his mother observed that he expectorated pieces of skin, continued for five or six months, then well for 3 years, and now present attack. Attack always comes on with catching cold. Paroxysmal hard ringing cough, and threatens suffocation, sometimes casts exporation with little difficulty, respiration sounds purile, heart normal, rhonchi are heard. Valvular clicking sound heard in the left supra scapular region. One or two casts generally brought up during the day.	Recovery.
1854.	40. PEACOCK. "PATH. SOC. TRANS." Vol.V. p.41	28	F.	Healthy in appearance and temperate Mother suffered 20 years from croup and haemoptysis. Three sisters died of phthisis. At age of 15 had cough and dyspnoea accompanied with fibrinous casts, expectorated and recovered every winter.	Last four years symptoms more severe, and had always been in winter troubled with cough and dyspnoea, which was very severe, no pain, no fever. The dyspnoea was very troublesome. She continued to expectorate the plastic masses casts 4 inches long. No haemoptysis, but she had spat blood sometimes when in a fit of coughing: damp weather most trying; cough always worst 3 days before the casts are expectorated.	Recovered

	Name of Author, Date. and Reference.	Age	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
1860.	41. OGLE, J.W. PATH. SOC. TRANS." LOND. p.23. Vol.XI.	16	M.	Had had attacks before.	Dyspnoea, livid swollen countenance; cough bad, with severe paroxysms; dulness over greater part of chest, with hardly any respiratory sounds to be heard; expectorated fibrinous casts in a few and recovered.	Died in another attack some time later.
1860.	42. SALTER & HYDE. "PATH. SOC. TRANS. LOND." p.36. Vol.XI.			Perfect health.	Signs of bronchitis; pain behind sternum, pneumonic crepitations over a small area the size of a shilling; fine type; paroxysmal cough and dyspnoea, then expectoration of casts.	Recovered.
1860.	43. MUNNELEY. "PATH. SOC. TRANS." Vol.XI. p.23.	16	M.	Healthy.	Great difficulty of breathing; livid swollen countenance; rapid pulse; dulness over greater part of the chest; hardly any respiratory sounds. After a few days he recovered, having expectorated fibrinous casts with a great deal of fragments; similar attack in a few months; no evidence of any serious lung mischief.	Recovered first, subsequently died from a similar attack.
1864 to 1865.	44. HALDANE. "EDINBURGH MEDICAL JOURNAL." Vol.X. p.657.	30	M.	Healthy.	Slight dulness under clavicle and signs of catarrh; cough paroxysmal, dyspnoea: no haemoptysis; expectorated casts which sometimes were slightly streaked with blood. This went on for months.	Recovered.
1865.	45. PEACOCK. Vol.X. p.65.	38	M.	Printer by trade.	Expectorated masses; diminished expansion of chest, deficiency of resonance on percussion beneath each clavicle; especially on right	P.M. very imperfect, Died.

	Name of Author. Date. and Reference.	Age.	Sex.	Previous State of Health.	Mode of Attack and History of Case.	Result.
					side where bronchial respiration, and irregular crepitation were audible; had dyspnoea, cough, expectorations and pain in chest; left side of face puffy and had diarrhoea; no albumen in urine; oedema and dyspnoea increased; severe pain in lower part of left side; dulness on percussion; also present mucus and subcrepitant rhonchi, he sank and died.	P.M. Adhesion plentiful, cavities in lungs, lower part solid and collections of pus. White, yellow coloured deposits resembling medullay sarcoma, some as large as hens eggs same in substance as casts.
1865.	46. FAGGE. "PATH. SOC. TRANS." LOND. Vol.XVI. p.48.	7.	F.	Suffering for 10 days with cough, spasmodic, otherwise healthy.	Cough spasmodic in character; sputum contained mucus and blood; she then expectorated casts - one was ejected at least every day; one very large cast was ejected after very distressing spasm of coughing, dyspnoea, and stridulous rale on the left side. In one attack she fought for her breath, became dark in the face and died. Pertussis was present in the house, a sister suffering from it.	Died. P.M. Upper parts of respiratory tract healthy, lower part of trachea occupied by a large fibrinous cast ramification extended to right bronchia.
1868.	47. DOUGLAS. "EDINBURGH MED. JOURNAL. July.	31.	M.	Quite well up to the previous day. Two of his children had died within 12 months of diphtheria.	Flushed, warm and distressed, disabled by acute pain in the left mannuay region, catching his breath darting to the back of his chest; pulse 100; had rigors and headache; no physical signs of pulmonary disorder; next day rather worse; at the back	Recovery.

	Name of Author, Date, and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
					there was dulness on percussion; on second day tubular breathing and other signs of consolidation; no crepitations or pulmonary rattle; 5th day, dulness on opposite side; no cough, but pain on right side set in. The back of entire throat, coated with grey follicle; 8th day, very much better; he expectorated globular masses pearly white mucus which sank in water, they turned out to be bronchial casts; the physical signs gradually disappeared, and the man got rapidly better. Importance is in the pneumonic character of its early stages and the quasi diphtheritic state of the throat which it subsequently presented; no blood in the sputum.	
1870.	48. TUCKWELL. "PATH. SOC. TRANS. LOND." Vol. XXI. p. 64.	11	M.	Subject of Chronic Bronchitis. Supposed to have some collapse of lung rather than Phthisis from the physical signs and low temperature.	Dyspnoea severe, and paroxysmal cough superadded to the chronic bronchitis; expectorated aborescent casts of the bronchial tubes of great tenacity; temperature normal; no haemoptysis; physical signs of diffuse bronchitis in both lungs, with a peculiar loud and bubbling crepitation in the left lateral and infra scapula region, indicating probably a dilated bronchi.	Recovered.
1873.	49. PEACOCK. "PATH. SOC. TRANS. LOND." p. 20, XXIV.	45	M.	Bronchitis and Phthisis.	Copious heamoptysis for 10 to 12 days, with signs of bronchitis; coughed up moulded coagula: this was formed of blood as shown under the microscope, and thus different from casts of fibrous bronchitis.	Died of Phthisis.

	Name of Author, Date, and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
1874.	50. PAYNE. "LANCET" 11, p.656.	16	M.	As a child he had Diphtheria.	Coughing up frequently, almost daily, a firm white material; chest had some sibilant rhonchi, otherwise healthy; has brought up casts for 2 years; cured in 2 months. Inhalation of creosote and tinct. iodine.	Recovered.
1877.	51. HALL. F. DE HAVILLA. "St.BARTS. HOSP. REPORTS. XIII. p.125	19	M.	Always been delicate. Three years ago was laid up in bed, and coughed up branched pieces of soft matter like white of egg.	Pain in hypochondrium and cough; pulse 185; respiration 36; temp. 101.2; some rhonchi over the back; expectoration copious, and by far the largest part were casts; urine a trace of albumen; had a second attack; sputa came up with great ease in this case. Physical signs showed plainly that the bronchi on the left side close to the bifurcation of the trachea were blocked, owing to the dulness on percussion and loss of vocal fremitus, as the casts were expectorated the normal breath sounds came back; albumen in urine ceased when the fibrinous casts ceased.	Recovered.
1880.	52. GLASGOW. "LONDON MEDICAL RECORD." P.410.	17	M.	A year previous had cold which lasted six months, but got better.	Cough commenced, hacking in character; noticed bits of cast in the expectoration, also feeling of tightness in the chest; one day caught cold, and seized with paroxysm and high temp., coughed up large mass which was bronchial; caused great relief; similar one brought up in a few hours.	Recovered.

	Name of Author, Date and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
1880.	53. STREETS, Thos.H. AMERICAN JOURNAL OF MEDICAL SCIENCE. p.140. LXXIX.	39	M.	Bronchial Catarrh.	1st attack of bronchitis got better, no casts; 2nd attack the casts appeared 6 or 7 daily, size of goose quill; haemoptysis followed from straining at coughing, which was paroxysmal, also dyspnoea; considerable pain and swelling in right knee; attack of epistaxis; coughed up larger casts than usual, also bleeding from the gums. The blood had evidently lost its coaguability. He developed an eruption of impetigo on the head in one of the relapses, in another herpes.	Recovered.
1881.	54. BARROW. "LANCET". II. p.905.	42	F.	Intemperate Habits.	Three or four days had a bad cold; symptoms referable to trachea were present; tenderness on pressure; harsh dry cough; expectoration of a muco-purulent character; great difficulty and pain in swallowing, and urgent dyspnoea: breathing 38: over the trachea there was a valvular to and fro sound as of membrane loose and occluding the passage; rales at base of lungs; no haemoptysis expectoration; large shreds of membrane; temp. 101° F.: temp. went up higher. She coughed frequently, and shreds were expelled. Struggling was violent, and she died in one of these attacks. At p.m. examination large cast was found blocking the trachea. Acute case of fibrinous bronchitis; disease inferred to have started in trachea, and passed downwards not upwards; casts tubular.	Died.

	Name of Author, Date and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
1883.	55. ESCHERICH. "LOND. MED. RECORD." May. 15th, Vol. XI. p.175. (States five cases).		F.		Well marked pneumonia and pleurisy, symptoms which increased till death. P.M. fibrinous coagulation found in the bronchi of left side.	Died.
	56. (Case II.)		F.		Fibrous bronchitis was primary, preceded by cough, feverishness, and difficulty of respiration for a few days, and rise of temperature and expectoration of small plugs of fibrin, disappearing after 3 or 4 days. In one case some splenic and glandular enlargement.	Recovered.
	57. (Case III.)		F.			Recovered.
	58. (Case IV.)		F.	Chronic course, with acute attacks at intervals.	Fits of coughing four or five times a day; cyanosis of face and pain down sternum, ending with feeling that something had loosened in the chest, and expectoration of casts accompanied with mucus and clots of fibrin; suffered after with symptoms of remittent fever and enlarged spleen.	Recovered.
	59. (Case V.)		F.	Congenital stenosis of mitral valve, also aortic and pulmonary.	Fibrous coagula appeared in the serous expectoration; lasted ten days, then disappeared.	Recovered.
1889.	60. GIBSON. "PRACTITIONER" XLIII. p.85.	45	M.	Lived in Jamaica. Free liver and was being attended for D.T.	Suddenly attacked with cough and haemoptysis; haemoptysis slight, and expectoration was scanty: it consists of casts; very little dyspnoea; at no time symptoms of suffocation. Temperature not raised: attack lasted few days, then subsided.	Recovered.

	Name of Author, Date, and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
1889.	61. STIRLING. "PRACTITIONER". Vol.42, p.401.	30.	M.	Had attack of sciatica. Temperate and very healthy past history.	Shortness of breath and spasmodic cough; brought up pieces of white substance, often tinged with blood, this continued, the coung becoming more frequent and the fragment larger till the end of six days; lack of breath, sounds on left side, pain in chest, and abdomen down the middle line; temperature generally about normal; some casts 6 inches.	Recovered.
1889.	62. WEST, S. "PRACTITIONER" Vol.43. (2 cases.)		F.	Had attack of what was called asthma. Had previously had bronchitis.	Paroxysm of coughing came on at night regularly, at 2 a.m.; breathing asthmatic in character; but no cyanosis; expectorated casts, which were much ramified, small in character; no haemoptysis occurred; no temp.; no physical signs in chest.	Recovered.
	63. (Case II.)	45	M.	Had Delirium Tremens, then cough.	Had attack of haemoptysis which was slight, and the sputa scanty, consisted of casts; at times symptoms of suffocation; no temp.; no pneumonia or diphtheria, nor was the patient particularly ill; attack lasted only a few days and the subsided; no return.	
1890.	64. ROBERTS, Sydney. "MEDICAL PRESS." Vol.2, p.496.	16	M.	Delicate and subject to attacks of cough and had had expectoration for two years. Bronchitis and consumption in the family.	Brings up solid lumps of white phlegm, with paroxysmal cough and attacks of dyspnoea; the phlegm when put into water spreads out like branches of tree; the cough is hard and ringing, and threatens suffocation; 2 or 3 fleshy lumps are brought up in 24 hours; casts streaked with blood; finer twigs are softer and more gelatinous. The attack continued	Recovered.

	Name of Author, Date, and Reference.	Age	Sex	Previous State of Health.	Mode of Attack and History of Case.	Result.
					for 10 months without any interval; bronchitic rales present in chest, and flapping sound heard towards the end of inspiration over the right bronchia.	
1893.	65. OGLE. "LANCET" 2/93. p.1538.			Ill for a year. Before that good health.	Brought up by coughing every 3 or 4 days, large quantities of plastic lymph, and pieces resembling macaroni, in their entire shape having the appearance of a mould of the bronchial ramification. Benefited from inhalation of pix liquida, 3 drachms to pint of water.	Recovered.
1893.	66. COOK. "MEDICAL PRESS." 2/93. p.603.	52	F.	Small pox when 3 or 4 years old, 18 years ago; immediately after last confinement she spat up something like thick phlegm, no recurrence: no rheumatism or haemoptysis.	Sent for doctor in great hurry, as was suffering from a severe attack of dyspnoea, gasping for breath and feeling of suffocation. Lips livid: skin dry and hot; temp. 103°, looks anxious; frequent hard dry cough; no expectoration; has headache, rigors, and choking feeling; wants to get something up; pulse 100; respiration 40 to the minute; no pain in chest; less movement on left side of chest than on the right; no dulness on percussion; moist rales on left side. gave apamorphia 1/10 grain every ten minutes, and vomited casts. She continued to expectorate small pieces for next few days. Five years previous she had another attack.	Recovered.

	Name of Author, Date, and Reference.	Age	Sex	Previous State of of Health.	Mode of Attack and History of Case.	Result.
1899.	67. DRUMMOND. B.M.J., July 8th. 1899. p.70 (Two cases.)	47	M.	Up to three years ago healthy man, then caught cold on chest.	Recurrent attacks of dyspnoea; cough paroxysmal, with pain in chest, and choking sensation, which was always relieved by patient expectorating rounded masses: seemed like inspissated mucus; pain right chest, no trace of blood; recovered during last three years; temp. never rose.	Recovered.
	68. (Case II.)	9	M.	Years ago had epistaxis, delicate looking boy. Five years ago had rheumatic fever, which left systolic mitral murmur.	Four months has had paroxysmal cough, recurrent, and dyspnoea, and expectorating worms; only expectorated one cast at a time; no cyanosis.	Recovered.

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